Developmental Biology

An International Journal Published under the Auspices of the Society for Developmental Biology

EDITOR-IN-CHIEF: Anthony P. Mahowald

ASSOCIATE EDITORS

Merton K. Bernfield
Ira B. Black
Peter J. Bryant
Charles P. Emerson, Jr.
David Epel
David Hirsh
Richard Hynes
William F. Loomis, Jr.
Gerald M. Rubin
L. Dennis Smith
Davor Solter
Robert L. Trelstad
Virginia Walbot

EDITORIAL ASSISTANT: Juanita Parker

ADVISORY EDITOR
Igor B. Dawid

VOLUME 90, 1982

ACADEMIC PRESS
New York London
Paris San Diego San Francisco São Paulo Sydney Tokyo Toronto

Copyright © 1982 by Academic Press, Inc.

All Rights Reserved

No part of this publication may be reproduced or transmitted in any form, or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the copyright owner.

The appearance of the code at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use, or for the personal or internal use of specific clients. This consent is given on the condition, however, that the copier pay the stated per copy fee through the Copyright Clearance Center, Inc. (21 Congress Street, Salem, Massachusetts 01970), for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. Copy fees for pre-1982 articles are the same as those shown for current articles.

MADE IN THE UNITED STATES OF AMERICA

Contents of Volume 90

NUMBER 1, MARCH 1982

Full Papers

SUSAN M. ELSEVIER. Messenger RNA Encoding Basic Chromosomal Proteins of Mouse Testis 1

M. DOREE, K. SANO, AND H. KANATANI. Ammonia and Other Weak Bases Applied at Any Time of the Hormone-Dependent Period Inhibit 1-Methyladenine-Induced Meiosis Reinitiation of Starfish Oocytes 13

RICHARD G. JANZEN, GLEN K. ANDREWS, AND TAIKI TAMAOKI. Synthesis of Secretory Proteins in Developing Mouse Yolk Sac 18

KLAUS VON DER MARK, PHILIP OSDOBY, AND ARNOLD I. CAPLAN. Effect of 4-Methylumbelliferyl-β-D-xyloside on Collagen Synthesis in Chick Limb Bud Mesenchymal Cell Cultures 24

JOHAN THYBERG, HALINA SIERAKOWSKA, JAN-ERIK EDSTRÖM, KARIN BURVALL, AND ANDREW PIGON. Mitochondrial Distribution and ATP Levels in *Chironomus* Salivary Gland Cells as Related to Growth, Metabolic Activity, and Atmospheric Oxygen Tension 31

HAJIME FUJISAWA, NOBORU TANI, KENJI WATANABE, AND YASUHIKO IBATA. Branching of Regenerating Retinal Axons and Preferential Selection of Appropriate Branches for Specific Neuronal Connection in the Newt 43

A. M. BRETON AND Z. R. SUNG. Temperature-Sensitive Carrot Variants Impaired in Somatic Embryogenesis 58

C. K. GOVIND AND JOANNE PEARCE. Proliferation and Relocation of Developing Lobster Neuromuscular Synapses 67

DIANNA H. AUSPRUNK. Synthesis of Glycoproteins by Endothelial Cells in Embryonic Blood Vessels 79

CLAUDIA KENT. Inhibition of Myoblast Fusion by Lysosomotropic Amines 91

RICHARD BURT AND JOHN PALKA. The Central Projections of Mesothoracic Sensory Neurons in Wild-Type *Drosophila* and *bithorax* Mutants 99

GREGORY L. SHIPLEY AND CHARLES E. HOLT. Cell Fusion Competence and Its Induction in *Physarum polycephalum* and *Didymium iridis* 110

JAMES J. TOMASEK, JOSEPH E. MAZURKIEWICZ, AND STUART A. NEWMAN. Nonuniform Distribution of Fibronectin during Avian Limb Development 118

LORETTE C. JAVOIS AND LAURIE E. ITEN. Supernumerary Limb Structures after Juxtaposing Dorsal and Ventral Chick Wing Bud Cells 127

PETER T. BROWER AND RICHARD M. SCHULTZ. Intercellular Communication between Granulosa Cells and Mouse Oocytes: Existence and Possible Nutritional Role during Oocyte Growth 144

KEITH R. MAROTTI, DOMINIQUE BELIN, AND SIDNEY STRICKLAND. The Production of Distinct Forms of Plasminogen Activator by Mouse Embryonic Cells 154

OTTO VOGEL. Experimental Test Fails to Confirm Gradient Interpretation of Embryonic Patterning in Leafhopper Eggs 160

JEANNE LORING, BENGT GLIMELIUS, AND JAMES A. WESTON. Extracellular Matrix Materials Influence Quail Neural Crest Cell Differentiation *in Vitro* 165

PHILIP H. BONNER AND THOMAS R. ADAMS. Neural Induction of Chick Myoblast Differentiation in Culture 175

LEA ZISKIND-CONHAIM AND JEFFREY I. BENNETT. The Effects of Electrical Inactivity and Denervation on the Distribution of Acetylcholine Receptors in Developing Rat Muscle 185

Brief Notes

SHIGEO DAIKOKU, MIKA CHIKAMORI, TOHRU ADACHI, AND YUZO MAKI. Effect of the Basal Diencephalon on the Development of Rathke's Pouch in Rats: A Study in Combined Organ Cultures 198

J. M. Icardo, J. L. Ojeda, and J. M. Hurle. Endocardial Cell Polarity during the Looping of the Heart in the Chick Embryo ... 203
Brigid L. M. Hogan, Amanda Taylor, and Ashley R. Cooper. Murine Parietal Endoderm Cells Synthesise Heparan Sulphate and 170K and 145K Sulphated Glycoproteins as Components of Reichert's Membrane ... 210
Gary B. Silberstein and Charles W. Daniel. Glycosaminoglycans in the Basal Lamina and Extracellular Matrix of the Developing Mouse Mammary Duct ... 215
Georgiana Jagiello, Susan Downey, and Mercedes Ducayen. X-Chromosome Heteromorphism and Appearance of Meiosis in the Rat Fetal Ovary ... 223
Feature ... f-1

Number 2, April 1982

Full Papers
Karen Kaye Smith and Sidney Strickland. Plasminogen Activator Production by Parietal Endoderm Cells: Stimulation by a Protein from Pituitary ... 227
Diana Gold Myles and Peter K. Hepler. Shaping of the Sperm Nucleus in *Marsilea*: A Distinction between Factors Responsible for Shape Generation and Shape Determination ... 238
Irandokht Hadji-Azimi, Joseph Schwager, and Charles Thiebaud. B-Lymphocyte Differentiation in *Xenopus laevis* Larvae ... 253
Brooke S. Kirby, Peter J. Bryant, and Howard A. Schneiderman. Regeneration following Duplication in Imaginal Wing Disc Fragments of *Drosophila melanogaster* 259
Robert V. Storti and Alice E. Szwast. Molecular Cloning and Characterization of *Drosophila* Genes and Their Expression during Embryonic Development and in Primary Muscle Cell Cultures ... 272
T. Schmidt, C. Patton, and D. Epel. Is There a Role for the Ca^{2+} Influx during Fertilization of the Sea Urchin Egg? ... 284
Merton Bernfield and Shib D. Banerjee. The Turnover of Basal Lamina Glycosaminoglycan Correlates with Epithelial Morphogenesis ... 291
David I. Rubin and Hans R. Bode. Nematocyte Development in *Hydra attenuata* Is Dependent on Both the Interstitial Cells and the Epithelial Cells ... 306
R. Belle, J. Boyer, and R. Ozon. Carbon Dioxide Reversibly Inhibits Meiosis of *Xenopus laevis* Oocyte and the Appearance of the Maturation Promoting Factor ... 315
Eric Wieschaus and Rolf Nöthiger. The Role of the Transformer Genes in the Development of Genitalia and Analia of *Drosophila melanogaster* ... 320
C. D. McCaig and K. R. Robinson. The Ontogeny of the Transepidermal Potential Difference in Frog Embryos ... 335
R. J. Hill, F. Watt, M. A. Yund, and J. W. Fristrom. The Effect of 20-Hydroxyecdysone on Synthesis of Chromosomal and Cytosol Proteins in Imaginal Discs ... 340
H. Bałakier and R. A. Pedersen. Allocation of Cells to Inner Cell Mass and Trophectoderm Lineages in Preimplantation Mouse Embryos ... 352
Ann Sodja, Robert Arking, and Rasheeda S. Zafar. Actin Gene Expression during Embryogenesis of *Drosophila melanogaster* ... 363
D. P. Jackson, A. H. Chan, and D. A. Cotter. Utilization of Trehalose during *Dictyostelium discoideum* Spore Germination ... 369
Stephen P. Szabo, Danton H. O'Day, and Abdul H. Chagla. Cell Fusion, Nuclear Fusion, and Zygote Differentiation during Sexual Development of *Dictyostelium discoideum* ... 375
David Stopak and Albert K. Harris. Connective Tissue Morphogenesis by Fibroblast Traction. I. Tissue Culture Observations ... 383
Richard Rutz, Claire Haney, and Stephen Hauschka. Spatial Analysis of Limb Bud Myogenesis: A Proximodistal Gradient of Muscle Colony-Forming Cells in Chick Embryo Leg Buds ... 399
William F. Loomis and Steven A. Wheeler. Chromatin-Associated Heat Shock Proteins of *Dictyostelium* ... 412
Michael J. Katz, Raymond J. Lasek, Philip Osdoby, J. Richard Whittaker, and Arnold I. Caplan. Bolton-Hunter Reagent as a Vital Stain for Developing Systems 419

Brief Notes
EILEEN D. ADAMSON AND JOSEPH B. WARSHAW. Down-Regulation of Epidermal Growth Factor Receptors in Mouse Embryos 430
BRUCE M. CARLSON. The Regeneration of Axolotl Limbs Covered by Frog Skin 435
HISAKO MURAMATSU AND TAKASHI MURAMATSU. Decreased Synthesis of Large Fucosyl Glycopeptides during Differentiation of Embryonal Carcinoma Cells Induced by Retinoic Acid and Dibutyryl Cyclic AMP 441
WILLIAM J. WASSERMAN. The Role of the Maturation-Promoting Factor in Controlling Protein Synthesis in *Xenopus* Oocytes 445
Author Index for Volume 90 448
Feature f-1

The Subject Index for Volume 90 will appear in the December 1982 issue as part of a cumulative index for the year 1982.

DEVELOPMENTAL BIOLOGY **90**, f-1 (1982)

FEATURE

Fourteenth Miles International Symposium

"CELL FUSION"

Johns Hopkins Medical Institutions
Baltimore, Maryland USA
June 7-9, 1982

Preliminary Program

Haploid Cell Fusion (Fertilization)
Bennett M. Shapiro (Seattle)

Cell Fusion Other Than Hybridomas
Francis H. Ruddle (New Haven)

Protoplast (Plant & Bacterial) Fusion
Edward C. Cocking (Nottingham)

Plant Cell Fusion
Eugene W. Nester (Seattle)

Hybridomas
J. Thomas August (Baltimore)

Monoclonal Antibodies
To be selected

A session consists of 5-6 presentations of 20-25 minutes each and concludes with a 50-60 minute discussion moderated by the Session Chairman.

FOR FURTHER INFORMATION CONTACT:

Edward G. Bassett, Ph.D.
Symposium Coordinator
Miles Laboratories, Inc.
P.O. Box 40
Elkhart, IN 46515 USA
(219) 264-8460

OPEN TO ALL INTERESTED INVESTIGATORS

Copyright © 1982 by Academic Press, Inc.
All rights of reproduction in any form reserved.

Information for Authors

Developmental Biology will publish papers on problems of development in the broadest sense. Embryonic and postembryonic development, growth, regeneration and tissue repair in plants and animals, and the analysis of these phenomena at the molecular and cellular levels are topics suitable for the journal. Papers on reproductive biology, aging, and teratology will be published only when they bear on developmental mechanisms of general interest. Papers are sought that employ the techniques and concepts of many disciplines including those of biochemistry, biophysics, cytology, experimental morphogenesis, genetics including cell genetics, immunology, neurobiology, physiology, and microbiology, In all areas, analytical rather than descriptive studies will be favored.

Original papers only will be considered. Submission of a manuscript implies the authors' assurance that the same work has not been and will not be published nor is presently submitted elsewhere, and that all persons listed as authors have given their approval for the submission of the paper; further, that any person cited as a source of personal communications has approved such citation. Explicit proof of these implied assurances may be required at the Editor's discretion. Articles and any other material published in *Developmental Biology* represent the opinions of the author(s), and should not be construed to reflect the opinions of the editor(s), the publisher, or the Society of Developmental Biology.

Authors submitting a manuscript do so on the understanding that if it is accepted for publication, copyright in the article, including the right to reproduce the article in all forms and media, shall be assigned exclusively to the Publisher. The Publisher will not refuse any reasonable request by the author for permission to reproduce any of his or her contributions to the journal.

Articles usually do not exceed 15,000 words and must be preceded by an abstract of about 200 words that should be fully intelligible by itself. Brief notes are 2500 words or less, including the bibliography, and should have an abstract of less than 100 words. All papers will be published in English.

Manuscripts should be concise. Full documentation of results in support of conclusions should be combined with maximum brevity compatible with clarity. The discussion section should relate the present work to previous knowledge but should not be expanded into a review of the field. The standard order of sections is: abstract, introduction, materials and methods, results and discussion. Combined results and discussion may be used. In the manuscript acknowledgment, references, footnotes, tables, and figure legends should follow the discussion in that order. All pages of the manuscript should be numbered consecutively and typed double-spaced throughout. Authors should provide a running title of 35 letters and spaces or less. Use footnotes sparingly. Cite them with superscript numbers and type them on a separate sheet. With rare exceptions do not italicize for emphasis.

In the Methods section, authors should draw attention to any particular chemical or biological hazards that may be involved in carrying out the experiments described. Any relevant safety precautions should be described; if an accepted code of practice has been followed, a reference to the relevant standards should be given.

Abbreviations and units should be used consistently. Consult the lists published in the *Proceedings of the National Academy of Sciences (U. S. A.)* the *Journal of Biological Chemistry,* and *Biochemistry* for standard abbreviations which need not be defined. Collect all abbreviations into a footnote and refer to it at the first use of an abbreviation. The use of units should follow the Système International. Use prefixes, e.g., μM, not 10^{-6} M. Note that *M* stands for molar, not mole. Use hr, min, sec, rpm, and cpm without definition, without a period, and without an "s" in the plural (i.e., 20 min).

Figures should be numbered consecutively in the order of their appearance and each should have a descriptive legend. Mark all figures with the author's name.

Line drawings should be made with India ink on smooth white paper or professional-quality drafting paper. Do not submit original line drawings larger in size than 13 × 10 in.; instead enclose smaller prints. Good quality prints are acceptable in any case. Drawings will be reduced as much as is compatible with the complexity of the figure, usually to column or page width. The lettering should be large enough to be at least 1.5 mm high after reduction.

Photographs should be the actual size for reproduction and labeled with letters 2 to 4 mm high. Figures should be planned to fit column (3.5 in., 89 mm) or page width (7.25 in., 184 mm); the depth of each column is 9 inches (228 mm). Sets of micrographs submitted in combinations up to 8 × 10.5 inches (203 × 267 mm) in size usually will be reproduced without reduction. For the best reproduction, provide clear, sharp, glossy prints with adequate contrast. The best results will be obtained if authors match the contrast and density of all figures appearing on a single plate. Figures that are

to appear together as one plate should be mounted on cardboard or paper as close together as possible. The printer will place thin white lines between the figures on each plate. Providing an overlay that indicates the most critical areas of the micrograph will aid in ensuring high-quality reproduction. Give magnifications in the legends or indicate them with a scale marker on the photograph.

The second copy of each manuscript must include good-quality glossy prints of all photographs. Two reviewer's copies should be submitted when originals are oversized or mounted on heavy cardboard.

The author will defray the expense of reproducing color figures.

Tables should be retyped on separate pages and numbered consecutively with Arabic numerals, and each should have a concise heading.

References to the literature should be cited as: Doe (1965) has observed that . . . ; (Doe, 1955); Doe *et al.* (1960) should be used in the case of articles with more than two authors. Use suffixes a, b, etc., following the date to distinguish two or more works by the same authors in the same year (Doe, 1960a,b). Numbered references will no longer be accepted. Arrange literature citations in the bibliography according to the surname of the author, using the following styles:

Hilfer, S. R., and Searls, R. L. (1980). Differentiation of the thyroid in the hypophysectomized chick embryo. *Develop. Biol.* **79,** 107–118.

Markert, C. L., and Papaconstantinou, J., eds. (1975). "The Developmental Biology of Reproduction." Academic Press, New York.

Spiro, R. G. (1972). Study of the carbohydrates of glycoproteins. *In* "Methods in Enzymoloy" (V. Ginsburg, ed.), Vol. 28, Part C, pp. 3–43. Academic Press, New York.

Abbreviate journal titles according to *Chemical Abstracts' Service Source Index.*

Page proofs rather than galleys will be sent. This speeds production. Detailed instructions will be sent with proofs. A quick response and minimal changes on proof are imperative to maintain schedules.

Features will include announcements of meetings and courses in the field of developmental biology, and some meeting reports. Persons interested in preparing meeting reports are encouraged to contact the Editor.

To submit a manuscript, send two copies to Anthony P. Mahowald, Department of Biology, Indiana University, Bloomington, Indiana 47405, Tel (812) 335-6102. Indicate the name, address, and telephone number of the author who should be contacted in editorial matters.